

206c can have a minimal thickness configured primarily as an electrically conductive shell for guiding power and data from the electronic device to which it couples and electrically conductive pathways within the accessory device. In some embodiments, electrical contacts **206a-206c** can have an average thickness of about 0.15 mm and be formed from a phosphorous bronze alloy. One reason the thickness of electrical contacts **206a-206c** can be so thin is that the contacts are recessed when not in use which prevents unnecessary wear and tear on electrical contacts **206a-206c**. Magnets **208a-208c** can take the form of high-strength permanent magnets, such as rare-earth magnets along the lines of neodymium magnets. Magnets **208a-208c** can have a size and shape complementary to an interior geometry of electrical contacts **206a-206c**, so that magnets **208** can be coupled with an interior volume defined by electrical contacts **206**. In some embodiments, magnets **208** can be adhesively coupled to an interior surface of a corresponding contact **206**.

Connector **200** can also include a number of magnetic shunts **210**. Magnetic shunts **210** can be affixed to a rear-facing portion of a corresponding contact **206**, thereby forming a number of floating contacts that each include contact **206**, magnet **208** and magnetic shunt **210**. Magnetic shunt **210** stays directly behind magnets **208** so that a magnetic fields emitted by magnets **208** are concentrated towards openings **204** defined by protective cover **202**. Magnetic shunts are generally made from a material resistance to the passage of magnetic fields. One common material utilized for magnetic shunts is stainless steel on account of it being able to redirect magnetic fields that would otherwise pass through the magnetic shunt. The magnetic fields emitted by magnets **208** can be arranged in various polarity patterns that help to encourage proper lineup between the floating contacts and corresponding contacts on a portable electronic device. For example, centrally positioned magnets could have one polarity and magnets arranged on the periphery could have an opposite direction polarity. These polarities could be matched with polarities associated with contacts of the portable electronic device. It should be noted that in some embodiments, electrical contacts **206** can include a seal that interacts with protective cover **202** to prevent the intrusion of moisture into an associated accessory device through **200**. For example, each of electrical contacts **206** can include an o-ring that creates an interference fit with a portion of protective cover **202** at least when the floating contacts are in the recessed position.

The floating contacts can be soldered to solder pads on flexible printed circuit board (PCB) **212**. The solder pads are situated on portions of a flexible circuit taking the form of flexible PCB **212** that have been partially separated from the rest of flexible PCB **212**. In this way, the portions of the flexible PCB upon which electrical contacts **206** are attached allow substantial movement of electrical contacts **206** away from flexible PCB **212**, so only minor amounts of stress are applied to flexible PCB **212** during movement of the floating contacts. By having three floating contacts, each of the floating contacts can be arranged to provide power, a ground or a data signal. When the central contact is associated with power, connector **200** can be arranged to accept either a ground or a data signal at either of the peripheral contacts. In this way, connector **200** can be coupled to a portable electronic device in either of two different orientations. Flexible printed circuit board **212** can be adhesively coupled with DC shield **214**. FIG. 2B shows a connector **250** having a configuration similar to that shown in FIG. 2A with the

inclusion of a fourth contact depicted as contact **256d**. In some embodiments, the fourth contact **256d** can provide additional power for connector **250**. In other embodiments, the additional contact **256d** can provide an additional data port for increasing a transmission speed of data through connector **250**.

FIG. 3A shows how the floating contacts are assembled together from electrical contact **206**, magnet **208** and magnetic shunt **210**. The arrows depicts how magnet **208** is inserted into a rear opening defined by electrical contact **206** and then how magnetic shunt **210** fits between multiple tails **302** of electrical contact **206**. FIG. 3B shows the floating contacts assembled and how protrusions **304** of magnetic shunt **210** fit between each of a number of tails **302** of electrical contact **206**. In some embodiments, electrical contact **206** can be adhesively coupled to both magnet **208** and magnetic shunt **210**.

FIG. 3B also shows a detailed view of flexible PCB **212**. Flexible PCB includes multiple electrically conductive pathways that couple the floating contacts with circuitry within the accessory device. Here it can be seen how flexible PCB **212** includes attachment features **306** that take the form of inner and outer rings of material of flexible PCB **212**, which gives each of attachment features **306** a somewhat spiral shaped geometry. In particular, one of attachment features **306** includes outer ring **306(1)a** and inner ring **306(1)b**. Outer ring **306(1)a** includes multiple solder pads **308** by which each attachment features **306** can be electrically and mechanically coupled with a floating contact and in particular with tails **302** of the floating contact. Outer ring **306(1)a** is coupled to the rest of flexible PCB **212** by inner ring **306(1)b**, which is in turn attached to the rest of flexible PCB **212** by an attachment member that takes the form of a narrow strip of material. On account of attachment features **306** following a linear path that includes multiple turns, attachment features **306** can allow the floating contacts to transition between engaged and recessed positions while placing minimal stress on attachment features **306** and flexible PCB **212**. This motion is accommodated primarily by the inner ring of each of attachment features **306** since the outer ring is soldered in four places to tails **302** of electrical contacts **206**. When connector **200** transitions between recessed and engaged positions attachment features **306** undergo a telescoping action to accommodate the motion. It should also be noted that while each of attachment features **306** is depicted as being oriented in a different direction, that the flexible connectors could also each be oriented in the same direction or have their orientations vary in different amounts or patterns.

FIG. 3C shows a view of the floating contacts soldered to the solder pads arranged on attachment features **306** of flexible PCB **212**. FIG. 3C also shows how flexible PCB **212** can be adhesively coupled with DC shield **214**. DC shield can be formed from any number of magnetically attractable materials. In one particular embodiment DC shield **214** can be formed for stainless steel (SUS) **430**. In another embodiment, DC shield **214** and magnetic shunts **210** can be formed of a cobalt iron alloy. It should be noted that in some embodiments only a periphery of flexible PCB **212** is coupled with DC shield **214**, thereby allowing attachment features **306** to telescope away from DC shield **214** to accommodate movement of the floating contacts. Flexible PCB **212** can be coupled to DC shield **214** in many ways including by a layer of adhesive. In some embodiments, the layer of adhesive forms an insulating layer that electrically isolates flexible PCB **212** from DC shield **214**.